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1. Lignofol' is a special type of wood plastic that is manufactured in different grades of hardness. There are twelve such grades of which #12 is the hardest and has been chosen as the substitute for lignum vitae in deadwood bearings. Lignofol' is a laminated wood plastic made up of veneer ply, bonded with a synthetic resin. The surface which is perpendicular to the layers of ply is the working surface of lignofol'. A birch veneer ply, 0.5 to 2.0 mm thick, which is treated with an alcohol solution of synthetic resins is used in the manufacture of lignofol'.

2. Lignofol' is manufactured in the form of slabs with the following dimensions:

Length	750-1,000mm
Width	500-800mm
Thickness	30, 40, 45 and 50mm

The physico-mechanical properties of lignofol' are as follows:

- (a) Specific gravity of not less than 1.35.
- (b) Swelling in water, is the increase in cross-sectional area after being immersed in water for 72 hours, not more than 4%.
- (c) Compression strength, determined by pressure on the working surface of not less than 1300 kg/square centimeter.

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- (d) Brinell hardness, as determined by the pressure on the working surface of a load of 250 kg exerted through a ball of 10mm diameter, must be not less than 20 kg/square millimeter.
3. The manufacture of bearing linings (vkladysb) and the assembly of them into collars (vtulka) consists of the following operations:
- (a) Sawing the slabs of lignofol' into blocks
 - (b) Soaking these blocks in water for five days
 - (c) Planing the soaked blocks to the required thickness of the bearing lining
 - (d) Milling the planed blocks to give them the final form of the bearing
 - (e) Assembly of the finished bearing lining into a collar (vtulka)
 - (f) Soaking the assembled lining into a collar for five days
 - (g) Final boring of the lining and collar by a lathe
4. For fine milling of lignofol' it is necessary to do the milling under high speeds with slow feed and an increased number of cuts. Lignofol' slabs can be sawed with either a band saw or a circular saw, and the following cutting speeds are permissible: for sawing with a band saw, 20 to 25 meters per second, the speed for feeding the material being one to two meters per minute; for sawing with a circular saw, the diameter must be no greater than 400 mm, the number of revolutions 1200-1400 per minute, the pitch of the teeth of the saw must be no greater than 10 to 12 mm, the height of the teeth 10 to 12 mm and the speed of feeding the material being two to three meters per minute.
5. The planing of the blocks can be done on a planer with a circumferential speed of the cutting shaft 20 to 25 meters per second, the material feeding at a speed of one meter per minute. Finishing on the milling machine must be done with a cutter's circumferential speed of 10 to 12 meters per second and higher. Boring of the assembled collar and lining on the lathe must be done with a circumferential speed of not less than five meters per second and with the feed of the tool rest about 0.1 mm per revolution of the spindle.
6. The assembly of the bearing lining must be done so as to assure the tightness of fit of the lining elements against each other and the surface of the bushing. No gap or clearance is allowed between adjoining elements. Furthermore the edges of the longitudinal joints must be fitted exactly to each other.
7. Friction tests on lignofol' gave excellent results. The unit pressure of the tested blocks was set at four times greater than the unit pressure produced by machinery on ships equipped with weighted propellers. In the tests, pressure was set at not less than 30 kg per square centimeter, while maximum pressure under actual conditions on icebreakers with weighted screws is approximately seven kg per square centimeter.
8. The tested surface of the blocks was found to be polished without signs of scoring. In the tests the most unfavorable conditions for operating with lignofol' blocks were imposed, however, the blocks were very little abraded. The abrasion amounted to about 0.5mm after 10 hours of operation.
9. Deadwood bushings of lignofol' were assembled for a whole series of ships. The initial 24-hour tests of ships carried out with the propeller shaft in operation at 100 rpm or more as well as with frequent reversals showed that the clearance in the bearings remained unchanged. Subsequent operation of the ships showed that deadwood bushings made of lignofol' showed vastly better results than deadwood bushings made of lignum vitae.

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10. It is typical that the first experiments in replacing lignum vitae linings with those made of lignofol' were carried out on ships and icebreakers of the Chief Directorate of the Northern Sea Route (GlavSovMorPut'). From 1949 on, the majority of ships and icebreakers of GlavSovMorPut' had deadwood bushings made of lignofol', and, as they sail in arctic waters, they showed the complete suitability of lignofol' as a material for lining deadwood bearings. Later, the Maritime Registry of the USSR gave permission for the manufacture of lignofol' deadwood bushings on ships of the Ministry of the Merchant Fleet.
11. The use of lignofol' instead of lignum vitae was new in maritime technology in the USSR, and, in view of its good working qualities, its introduction is being stepped up on all ships. In due course it was recognized, in the Merchant Fleet of the USSR, that lignofol' had solved the long and complicated problem of what to use as a substitute for lignum vitae in lining deadwood bearings. Boxwood had been used as a substitute, but it did not possess all of the qualities of lignum vitae and in addition it was expensive.
12. The use of wooden linings for deadwood bushings is extremely efficient for ships sailing in deep water. However, in shallow waters only metal (babbit) linings, with a special stuffing box located at the place where the tail shaft enters the hull of the ship, are used for the deadwood bearings. Ships sailing in the Caspian Sea are equipped exclusively with metal bearing linings for deadwood bushings. Experience has shown that wood facing wears out completely in the course of a few months and thereafter prolonged repairs are required for replacing the facing.

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